

**AMENDMENTS TO THE CLAIMS**

For the convenience of the Examiner, all claims have been presented whether or not an amendment has been made. The claims have been amended as follows:

1. **(Currently Amended)** A device comprising:  
a voltage-controlled oscillator (VCO) circuit, the VCO circuit comprising:
  - a) a variable capacitor for coarsely tuning the VCO circuit, the variable capacitor providing one of a plurality of capacitance values, each of the plurality of capacitance values corresponding to a distinct frequency band, each of the plurality of capacitance values providing a frequency/voltage characteristic for the VCO that is sufficiently linear to implement direct modulation for the frequency band, wherein the variable capacitor is a plurality of switchable capacitors, each capacitor coupled to a binary switch that allows the capacitor to be turned on or off;
  - b) a varactor for fine tuning the VCO circuit; and
  - c) a series capacitor having a capacitance value to linearize a frequency/voltage characteristic of the varactor sufficient to implement direct modulation for a specified channel frequency within the frequency band.
2. **(Canceled)**
3. **(Currently Amended)** The device of ~~Claim 2~~ Claim 1, wherein the plurality of capacitance values comprises sixteen capacitance values, each capacitance value corresponding to one of sixteen frequency bands.
4. **(Original)** The device of Claim 3, wherein the sixteen frequency bands cover a frequency range of 2200Mhz to 2700Mhz.
5. **(Original)** The device of Claim 4, wherein the specified channel frequency is a frequency selected from the group consisting of  $2402\text{Mhz} + n\text{Mhz}$ , where n is an integer from 0 to 78.

6. **(Currently Amended)** The device of ~~Claim 3~~ Claim 1, wherein the VCO circuit is implemented as an integrated circuit.

7. **(Original)** The device of Claim 6, wherein the series capacitor is a metal-insulator-metal type capacitor.

8. **(Original)** The device of Claim 1 further comprising:  
at least one resistor to couple an input voltage to the VCO circuit, the at least one resistor dampening external noise.

9. **(Original)** The device of Claim 8, wherein the input voltage comprises a reference voltage and a control voltage.

10. **(Original)** The device of Claim 9, wherein the reference voltage is used to bias a diode of the varactor to a desired bias point.

11. **(Original)** The device of Claim 10, wherein the series capacitor isolates the reference voltage.

12. **(Currently Amended)** A system comprising:  
a phase comparator circuit;  
a charge pump;  
a loop filter circuit;  
a fractional-n frequency divider; and  
a voltage controlled oscillator (VCO ) circuit, the VCO circuit comprising:  
a) a variable capacitor for coarsely tuning the VCO circuit, the variable capacitor providing one of a plurality of capacitance values, each of the plurality of capacitance values corresponding to a distinct frequency band, each of the plurality of capacitance values providing a frequency/voltage characteristic for the VCO that is sufficiently linear to implement direct modulation for the frequency band;  
b) a varactor for fine tuning the VCO circuit;  
c) a series capacitor having a capacitance value to linearize a frequency/voltage characteristic of the varactor sufficient to implement direct modulation for a specified channel frequency within the frequency band; and  
d) at least one resistor to couple an input voltage to the VCO circuit, the at least one resistor dampening external noise, wherein the input voltage comprises a reference voltage and a control voltage.

13. **(Original)** The system of Claim 12, wherein the variable capacitor is a plurality of switchable capacitors, each capacitor coupled to a binary switch that allows the capacitor to be turned on or off.

14. **(Original)** The system of Claim 13, wherein the plurality of capacitance values comprises sixteen capacitance values, each capacitance value corresponding to one of sixteen frequency bands.

15. **(Original)** The system of Claim 14, wherein the sixteen frequency bands cover a frequency range of 2200Mhz to 2700Mhz.

16. **(Original)** The system of Claim 15, wherein the specified channel frequency is a frequency selected from the group consisting of  $2402\text{Mhz} + n\text{Mhz}$ , where  $n$  is an integer from 0 to 78.

17. **(Currently Amended)** The system of ~~Claim 14~~ Claim 12, wherein the VCO circuit is implemented as an integrated circuit.

18. **(Original)** The system of Claim 17, wherein the series capacitor is a metal-insulator-metal type capacitor.

19. **(Canceled)**

20. **(Canceled)**

21. **(Original)** The system of Claim 20, wherein the reference voltage is used to bias a diode of the varactor to a desired bias point.

22. **(Original)** The system of Claim 21, wherein the series capacitor isolates the reference voltage.

23. **(Currently Amended)** A method for tuning a voltage-controlled oscillator (VCO) circuit, comprising:

coarsely tuning the VCO circuit to implement direct modulation for a frequency band, wherein coarsely tuning comprises providing one of a plurality of capacitance values;

finely tuning the VCO circuit using a varactor; and

linearizing a frequency/voltage characteristic of the varactor sufficient to implement direct modulation for a specified channel frequency within the frequency band.

24. **(Canceled)**

25. **(Previously Presented)** The method of Claim 23, wherein linearizing the frequency/voltage characteristic of the varactor is performed by a capacitor arranged in series with the varactor.

26. **(Previously Presented)** The method of Claim 23, further comprising coupling an input voltage to the VCO, wherein the input voltage comprises a reference voltage and a control voltage.

27. **(Previously Presented)** The method of Claim 26, further comprising biasing a diode of the varactor to a desired bias point using the reference voltage.

28. **(New)** The method of Claim 23, wherein the plurality of capacitance values are provided by a plurality of switchable capacitors, each capacitor coupled to a binary switch that allows the capacitor to be turned on or off.

29. (New) A device comprising:  
a voltage-controlled oscillator (VCO) circuit, the VCO circuit comprising:  
a) a variable capacitor for coarsely tuning the VCO circuit, the variable capacitor providing one of a plurality of capacitance values, each of the plurality of capacitance values corresponding to a distinct frequency band, each of the plurality of capacitance values providing a frequency/voltage characteristic for the VCO that is sufficiently linear to implement direct modulation for the frequency band;  
b) a varactor for fine tuning the VCO circuit;  
c) a series capacitor having a capacitance value to linearize a frequency/voltage characteristic of the varactor sufficient to implement direct modulation for a specified channel frequency within the frequency band; and  
d) at least one resistor to couple an input voltage to the VCO circuit, the at least one resistor dampening external noise, wherein the input voltage comprises a reference voltage and a control voltage.

30. (New) A system comprising:  
a phase comparator circuit;  
a charge pump;  
a loop filter circuit;  
a fractional-n frequency divider; and  
a voltage controlled oscillator (VCO ) circuit, the VCO circuit comprising:  
a) a variable capacitor for coarsely tuning the VCO circuit, the variable capacitor providing one of a plurality of capacitance values, each of the plurality of capacitance values corresponding to a distinct frequency band, each of the plurality of capacitance values providing a frequency/voltage characteristic for the VCO that is sufficiently linear to implement direct modulation for the frequency band, wherein the variable capacitor is a plurality of switchable capacitors, each capacitor coupled to a binary switch that allows the capacitor to be turned on or off;  
b) a varactor for fine tuning the VCO circuit; and  
c) a series capacitor having a capacitance value to linearize a frequency/voltage characteristic of the varactor sufficient to implement direct modulation for a specified channel frequency within the frequency band.--